Contents

Preface vii

Committees ix

Surface science and electrochemistry: concepts and problems
S. Trasatti 1

Molecular level studies of solid–gas and solid-liquid interfaces
G.A. Somorjai 10

In situ and ex situ IRAS, LEED and EC-STM studies of underpotentially deposited copper on a Pt(111) electrode in sulfuric acid solution: coadsorption of sulfate ion with copper
Y. Shingaya, H. Matsumoto, H. Ogasawara and M. Ito 23

2D and 3D thin film formation and growth mechanisms in metal electrocrystallization – an atomistic view by in situ STM
W.J. Lorenz and G. Staikov 32

Silver deposition on the Au(111) electrode without interference by specifically adsorbed anions
P. Mrozek, Y.-E. Sung and A. Wieckowski 44

Electrochemical and ultra-high vacuum characterisation of rhodium on Pt(111): a temperature dependent growth mode
G.A. Attard, R. Price and A. Al-Akl 52

Electrochemical iunvestigation of a structure sensitive growth mode: palladium deposition on Pt(100)-hex-R0.7° and Pt(100)-(1×1)
G.A. Attard and R. Price 63

In situ scanning tunneling microscopy of underpotential deposition of Ag on Pt(111)$(\sqrt{7} \times \sqrt{7})$R19.1°–I
N. Shinotsuka, K. Sashikata and K. Itaya 75

Electronic properties of a monolayer of thallium deposited on Ag(111)
E. Leiva 83

The effect of chloride on the underpotential deposition of copper on Pt(111): AES, LEED, RRDE, and X-ray scattering studies
N.M. Marković, H.A. Gasteiger, C.A. Lucas, I.M. Tidswell and P.N. Ross, Jr. 91

Anion effects and the mechanism of Cu UPD on Pt(111): X-ray and electrochemical studies
R. Gómez, H.S. Yee, G.M. Bommarito, J.M. Feliu and H.D. Abruña 101

Classification of growth behaviour for copper on various substrates with in-situ scanning probe microscopy
R.J. Nichols, E. Bunge, H. Meyer and H. Baumgärtel 110

Structure of electrodeposited Tl overlayers on Au(100) studied via surface X-ray scattering
J.X. Wang, R.R. Adzic, O.M. Magnussen and B.M. Ocko 120

Effect of trace amounts of Cl^- in Cu underpotential deposition on Au(111) in perchlorate solutions: an in-situ scanning tunneling microscopy study
J. Hotlos, O.M. Magnussen and R.J. Behm 129

In situ electrochemical STM imaging of roughened gold and platinum electrode surfaces
N. Breuer, A.M. Funtikov, U. Stimming and R. Vogel 145

Surface reconstruction of Au(100) electrodes monitored by far infrared spectroscopy
Y.-L. Mathis, K. Murakoshi, F. Bouamrane, P. Roy and A. Tadjeddine 155

Electrochemical surface conditioning of n-Si(111)
J. Rappich, M. Aggour, S. Rauscher, H.J. Lewerenz and H. Jungblut 160

Atomic resolution images of GaAs(111)A surfaces in sulfuric acid solutions
H. Yao, S.-L. Yau and K. Itaya 166

An investigation of the electrochemical and photoelectrochemical properties of the cuprous oxide/liquid phase boundary
M. Šmith, V. Gotovac, Lj. Aljinović and M. Lučić-Lavčević 171

Relating the in-situ, ex-situ, and non-situ environments in surface electrochemistry
E.M. Stuve, A. Krasnopoler and D.E. Sauer 177

UHV adsorption studies of K/H_2O on Pt(111) and O/CH_3COOH on Cu(110): orientation and intermediates
P. Baumann, G. Pirug, D. Reuter and H.P. Bonzel 186

Structural effects on ethine adsorption at gold single-crystal electrodes
V.M. Schmidt, J. Stumper, J. Schmidberger, E. Pastor and A. Hamelin 197

Interfacial structure of iodine electrodeposited on Au(111): studies by LEED and in situ STM
T. Yamada, N. Batina and K. Itaya 204

Vibrational spectroscopy of the electrochemical interface by visible-infrared sum-frequency generation
A. Tadjeddine, A. Peremans and P. Guyot-Sionnest 210

Characterization of an electrode adlayer by in-situ infrared spectroscopy: cyanide on Pt(111)
C. Stuhlmann 221

Adsorption of pyrazine on Au(111) and Ag(111): on the role of the electronic factor
V. Lazarescu 227

The influence of the state of the surface on the electrochemistry of iron and carbon steel electrodes in aqueous CO_2 solutions
K. Videm 235

Crystal face effects on adsorption of ionic and non-ionic species on Ag electrodes: an electrochemical and STM study
M.L. Foresti, G. Aloisi, M. Innocenti, H. Kobayashi and R. Guidelli 241

Investigation on the formation of RuO_2-based mixed oxide coatings by spectroscopic methods
J. Mink, J. Kristóf, A. De Battisti, S. Daolio and Cs. Németh 252

Adsorption of CO accompanied with simultaneous charge transfer on copper single crystal electrodes related with electrochemical reduction of CO_2 to hydrocarbons
Y. Hori, H. Wakebe, T. Tsukamoto and O. Koga 258

Sulfate adsorption at Au(111) electrodes: an optical second harmonic generation study
S. Mirwald, B. Pettinger and J. Lipkowski 264

Electrochemistry of the I-on-Pd single-crystal interface: studies by UHV-EC and in situ STM
M.P. Soriaga, J.A. Schimpf, A. Carrasquillo, Jr., J.B. Abreu, W. Temesghen, R.J. Barriga, J.-J. Jeng, K. Sashikata and K. Itaya 273

Structural transitions in uracil adlayers on gold single crystal electrodes
M.H. Hölzle, Th. Wandlowski and D.M. Kolb 281

Bromine adsorption on Pt(111), (100), and (110) – an STM study in air and in electrolyte
A.M. Bittner, J. Wintterlin, B. Beran and G. Ertl 291

Infrared spectroscopy of model electrochemical interfaces in ultrahigh vacuum: some implications for ionic and chemisorbate solvation at electrode surfaces
I. Villegas, N. Kizhakevariam and M.J. Weaver 300

In-situ spectroscopy of cyanide vibrations on Pt(111) and Pt(110) electrode surfaces: potential dependencies and the influence of surface disorder
K.A. Friedrich, W. Daum, C. Klünker, D. Knabben, U. Stimming and H. Ibach 315

Distribution of water molecules at Ag(111)/electrolyte interface as studied with surface X-ray scattering
M.F. Toney, J.N. Howard, J. Richer, G.L. Borges, J.G. Gordon, O.R. Melroy, D.G. Wiesler, D. Yee and L.B. Sorensen 326

Adsorption and hydrogenation of simple alkenes at Pt-group metal electrodes studied by DEMS: influence of the crystal orientation
U. Müller, U. Schmiemann, A. Dülberg and H. Baltruschat 333

What do we learn from model experiments of semiconductor/electrolyte interfaces in UHV: coadsorption of Br_2 with Na and H_2O on $WSe_2(0001)$
W. Jaegermann and Th. Mayer 343

On the role of Ru and Sn as promotors of methanol electro-oxidation over Pt
T. Frelink, W. Visscher and J.A.R. van Veen 353

Surface and electrochemical characterization of electrodeposited PtRu alloys
F. Richarz, B. Wohlmann, U. Vogel, H. Hoffschulz and K. Wandelt 361

Molecular dynamics simulation studies of the mercury–water interface
J. Böcker, R.R. Nazmutdinov, E. Spohr and K. Heinzinger 372

From regular to irregular solid electrode surfaces: a systematic approach to their characterization
A.J. Arvia and R.C. Salvarezza 378

Computational lattice-gas modeling of the electrosorption of small molecules and ions
P.A. Rikvold, M. Gamboa-Aldeco, J. Zhang, M. Han, Q. Wang, H.L. Richards and A. Wieckowski 389

The structure of water at platinum/water interfaces. Molecular dynamics computer simulations
X. Xia, L. Perera, U. Essmann and M.L. Berkowitz 401

Tunneling of electrons through thin layers of water
W. Schmickler 416

Molecular dynamics simulation of adsorption in electric double layers
M.R. Philpott, J.N. Glosli and S.-B. Zhu 422

Author index 432

Subject index 435

Materials index 441